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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/511,290

10/14/2004

Raimo Leimala

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EXAMINER

YANG, JIE

ART UNIT	PAPER NUMBER
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1709

MAIL DATE	DELIVERY MODE
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07/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/511,290

Applicant(s)

LEIMALA, RAIMO

Examiner

Jie Yang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/14/2004.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

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DETAILED ACTION

Acknowledge of the receipt of "applicant argument/remarks" filed on 10/14/2004.
Claims 1-13 have been amended from original claims, and claims 1-13 are pending in application.

Specification

Claim 12 is objected to because of the following informalities:

Regard to claim 12, The unit for "...0.1-1 gil..." should be "...g/l...". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kieswetter, Jr et al (U.S 3,951,649, thereafter '649) in view of Partridge (US 6,165,367, thereafter '367).

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'649 relates to "the recovery of metallic copper from raw materials which contain chemically bound copper.... The copper is extracted from the copper chloride solution with a liquid ion exchanger, which is then stripped with sulfuric acid.... Metallic copper is recovered from the copper sulfate solution by hydro-metallurgic reduction..." (Abstract of '649, and refer to Fig.1).

Regard to claims 1-4, '649 teaches: "...using an aqueous ferric chloride leach solution. It is desirable to use a leach solution which contains the maximum concentration of ferric chloride can be used without undesirable precipitation of ferrous chloride following the leaching and which also will maximum the formation of cuprous chloride rather than cupric chloride." (Col.2, Line 55-64). '649 also teaches: "After HCl has been removed from the leach solution, the leach solution is treated to remove ferrous chloride (impurity-noted by examiner)...." (Col.4, Line 33-47). Organic exchange reactant, like kerosene is used in '649 as leach slurry, but '649 does not explicitly teach to use "chelating ion-exchange resin". '367 relates "methods for selectively removing a heavy metal from an aqueous waste streams and more particularly to methods for reducing the heavy metal content in the waste steam to sub-ppm level." (Col.1, Line 5-9). '367 disclosed: "...providing a chelating resin containing amino-phosphonic group for capturing the heavy metal ions...."; "...wherein the chelating resin is a styrene divinylbenzene copolymer..." (Claims 1-4 of '367); '367 teaches the resin' group can be "represented as: $\text{-NH-CH}_2\text{-PO}_3\text{Na}_2$ " (Col.2, Line 22-37); and '367 also tests "...a chelating resin with iminodiacetic acid functional group..." (Col.4, Line 38-41). Compared with instant invention, '367 overlaps the limitations related to chelating ion-exchange resin recited in instant

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claims 1-4. Similar hydrometallurgical process to extract heavy impurities with similar ion exchange resin renders prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art to choose suitable ion-exchange resin as demonstrated in '367 in the process of '649. Claims 1-4 are rendered obvious by above references.

Regard to claim 5, which depended on claim 1, '649 shows extract iron and '367 teaches reducing heavy metal ions and the "heavy metal" includes, "at least uranium, zinc, nickel, cobalt, beryllium, lead, tungsten, vanadium and molybdenum." (Col.2, Line 17-19). Refer to the discussion above and the rejection for claim 1, claim 5 is rendered obvious by above references.

Regard to claim 13, which depended on claim 1. '649 and '367 teach the limitations for claim 1, and primary art '649 also point out: "...The copper sulfate solution is subjected to hydrometallurgical reduction with hydrogen gas to obtain high grade metallic copper." (Col.1, Line 60 to Col.2 Line 12 and cathode copper LME-A grade is one of high grades metallic copper-noted by examiner). But '649 does not explicitly teach the level of metal impurities. '367 teaches "methods for selectively removing a heavy metal from an aqueous waste streams and more particularly to methods for reducing the heavy metal content in the waste steam to sub-ppm level." (Col.1, Line 5-9, this metal impurity level is compatible with the level that recited by instant invention-refer to instant claim 12). This means it would have been obvious to one of ordinary skill in the art to get "cathode copper LME-A grade copper" as demonstrated in '367 in the process of '649. Refer to the rejection for claim 1, claim 13 is rendered obvious by above references.

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Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over '649 in view of 367, Everett (US 5,487,819, thereafter '819),

Regard to claims 8 and 9, which depended on claim 1, '649 and 367 teach the limitations for claim 1, but primary art '649 does not explicitly teach: "The metal impurities is carried out in an acidic environment"; or "...neutral environment." '819 relates to: "the production of metals from minerals, and more particularly to the production of base and precious metals from ores and concentrations, including the production of copper." (Col.1, Line 9-20). '819 teaches: "The pH of the electrolyte is increased from a level of below 3.5, typically up to a pH of 6 to 6.5. However, the upper level of the pH is monitored so that cuprous copper in solution is not precipitated. (In high chloride solutions, cuprous copper is stable in solution up to a pH of approximately 6.5 to 6.7...)" (Col.12, Line 28-37). '819 includes treatment unit which "can include thickening and/or filtration stages for removing the impurities..." (Col.7, Line 13-22). The pH range shown in '819 overlaps the limitations recited in claims 8 and 9. Compared with '819 and instant invention, similar metal recovery and impurities treatment processes prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art to choose suitable pH value as demonstrated in '819 in the process of '649. Claims 8-9 are rendered obvious by above references.

Claims 10-11, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over '649 in view of 367, and Hyvarinen et al (US 6,007,600, thereafter '600).

Regard to claims 10 and 11, which depended on claim 1, '649 and 367 teach the limitations for claim 1, but primary art '649 does not explicitly teach: "...the mother liquor in the resin is

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displaced before elution with an NaCl solution..."; and "...the majority of the metal impurities... are removed by hydroxide precipitation...". '600 relates to "a method for producing copper in a hydrometallurgical process from copper-bearing raw materials..." (Col.1, Line 4-20). '600 teaches: "...a countercurrent leaching of a sulfidic copper material, such as chalcopyritic copper concentrate, in a chloride milieu, so that the obtained product is essentially iron-free alkali chloride-copper chloride solution, where the copper is mainly monovalent..." (Col.2, Line 44-67 and also refer to Fig.1-3). '600 shows "...the leaching is performed into a circulating NaCl solution..." (Col.3, Line 35-46 and refer to Fig.1-3). '600 also teaches: "The precipitation is carried out by means of sodium hydroxide..." (Col.4, Line 3-19, refer to Fig. 1-3 step 13). Similar hydrometallurgical processes for leaching copper ('600) render prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art to choose suitable NaCl and NaOH treatment in operation as demonstrated in '600 to avoid "the drawback that it loses the advantage offered for the copper by hydrometallurgical chloride processes: the chance to make use of a lower degree of oxidation." (Col.2, Line 33-39 of '600) as used in the process of '649. Refer to rejection for claim 1, claims 10-11 are rendered obvious by above references.

Regard to claim 13, which depended on claim 1, '649 and 367 teach the limitations for claim 1, but primary art '649 does not explicitly teach: "...impurities are removed from a strong chloride solution of copper by ion exchange at least to a level that corresponds to cathode copper LME-A grade impurity level." (Cathode copper LME-A has a Cu content > 99.99%wt -noted by examiner). '367 teaches "methods for selectively removing a

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heavy metal from an aqueous waste streams and more particularly to methods for reducing the heavy metal content in the waste steam to sub-ppm level." (Col.1, Line 5-9, 1ppm = 1 mg/L for H₂O - noted by examiner). This content level is at the level of corresponds to cathode copper LME-A grade impurity level. Refer to discussion and rejection for claim 1, Claim 13 is rendered obvious by above references.

Claims 6, 7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over '649 in view of 367, '600, and Cupertino et al (US Re 36,118, thereafter '118).

Regard to claims 6 and 7, which depended on claim 1, '649 and 367 teach the limitations for claim 1, but primary art '649 does not explicitly teach "Alkali chloride content of the strong chloride solution is at least 200 g/l"; and "the amount of monovalent copper in the solution to be purified is 30-100 g/l". '600 relates to "a method for producing copper in a hydrometallurgical process from copper-bearing raw materials..." (Col.1, Line 4-20). '600 teaches: "...a countercurrent leaching of a sulfidic copper material, such as chalcopyritic copper concentrate, in a chloride milieu, so that the obtained product is essentially iron-free alkali chloride-copper chloride solution, where the copper is mainly monovalent..." (Col.2, Line 44-67 and also refer to Fig.1-3). However, '600 does not shown actual value for the limitations recited in instant claims. '118 teaches: "A method for separating a metal selected from the group...magnesium, copper, titanium, iron, zinc...from an organic complex thereof. Said method comprising treating the complex with a weakly acid aqueous solution of an alkali metal or alkaline earth metal chloride having a chloride content of at least 4 molar and an acid strength of up to 0.5 molar above the

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stoichiometric requirement for stripping the metal the metal whereby said complex is decomposed and metal ions are transferred to the aqueous solution." (Claim 1 of '118, 4 molar NaCl is about 232g/l and 0.5 molar copper is about 32g/l). '118 also points out: "Higher concentrations favour more complete extraction of impurity metals but may reduce the selectivity with which they are extracted." (Col.3, Line 38-44). "a chloride milieu" mentioned in '600 and value range claimed in '118 overlap the limitations recited in instant claims 6 and 7. Similar hydrometallurgical processes for leaching copper ('600) and for the recovery of metals from organic complexes (Col.1, Line 8-10 of '118) render prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art to choose suitable chloride milieu demonstrated in '600; and pick suitable alkali chloride content, for example 200g/l and suitable amount of monovalent copper in the solution, for example, 30-100g/l demonstrated in '118 as to avoid "the drawback that it loses the advantage offered for the copper by hydrometallurgical chloride processes: the chance to make use of a lower degree of oxidation." (Col.2, Line 33-39 of '600); and efficiently strip metal-loaded resins to selectively extract different metals (Examples 1-8 of '118) as used in the process of '649. Claims 6 and 7 are rendered obvious by above references.

Regard to claim 12, which depended on claim 11, '649, 367, and '600 teach the limitations for claim 11, '367 teaches a method for "removing low level of heavy metal...utilizes an ion exchange resin..."; (abstract of '367). '600 shows "the process of metal impurities are removed by hydroxide precipitation" as discussed in rejection for claim 11. But these references do not

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explicitly teach: "...to a content of 0.1-1 g/l,..." '118 shows: different metals (Fe, Ni, Zn, Cu) reacted with different strip solutions (A= 0.5 molar HCl; B= 0.5 Molar HCl +2.75 molar CaCl₂) in example 4 (Col.7, Line 6-43). The concentration levels of Fe, Ni and Zn in the aqueous phase after reacted with strip solution are less than 500 ppm (1ppm = 1 mg/L for H₂O— noted by examiner). This concentration range overlaps the limitation recited in instant claim. '118 also points out: "The results show that CaCl used as a source of chloride ions in examples 1-5 can be satisfactorily replaced by an alkali metal chloride or another alkaline earth metal chloride" (Col.8, Line 50-54). Similar hydrometallurgical processes for the recovery of metals from organic complexes (Col.1, Line 8-10 of '118) render prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art to expect similar level of metal impurities, for example: 0.1-1 g/l after being removed by hydroxide precipitation before the final purification in demonstrated in '118 as to efficiently strip metal-loaded resins to selectively extract different metals (Examples 1-8 of '118) as used in the process of '649. Refer to discussion and rejection for claim 1 and claim 11, Claim 12 is rendered obvious by above references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-270-1884. The examiner can normally be reached on M-F, 7:30-5:00 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

(JY)


MICHAEL B. CLEVELAND
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